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# PATENT SPECIFICATION

DRAWINGS ATTACHED



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## COMPLETE SPECIFICATION

### Crutch Tip

I, ALFRED A. SMITH, of 3030, East Olympic Boulevard, Los Angeles, California, United States of America, a Citizen of the United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention concerns a crutch tip.

An object of the invention is to provide a new and improved crutch tip which is so constructed that it is capable of bending as the crutch pivots, without such bending causing the base of the tip to become unseated from the ground.

One of the principal sources of difficulty in designing a satisfactory crutch tip is that the crutch shaft is necessarily directed at an angle when the crutch tip first engages the ground. The weight of the user is applied to the crutch shaft when the shaft is disposed at an angle and this force is directed against the crutch tip. Since this force is angular rather than directly downward, it necessarily has a horizontal component which acts against the crutch tip and which tends to unseat the base of the crutch tip from the ground. The effect of this horizontal component of unseating force can be reduced or minimized only by varying the construction of the crutch tip.

According to the present invention a crutch tip comprises a base, and neck disposed above the base, the neck having a hollow crutch shaft receiving passage therein, the neck having a single line of bending movement with respect to the base, the line being disposed a substantial distance above the bottom of the passage. Preferably the tip is formed of resilient material and the line is defined by an annular groove extending round the neck, the tip being capable of bending along the line in any direction.

The lower end of the passage may be out-

wardly enlarged to provide a free area which is adapted to permit substantial movement of the lower end of a crutch shaft within the passage when the neck is flexed. The base and neck may be formed of a single piece of resilient material, the free area being tapered outwardly and being substantially frusto-conical.

An annular horizontal groove may surround the neck adjacent the top of the base, the walls of the neck being thinner along the groove than along the adjacent portions of the neck and base so that the groove defines the bending line of the neck with respect to the base.

A disc may be disposed adjacent the bottom of the passage, the disc being disposed between the bottom of the crutch shaft and the bottom of the passage when the crutch tip is in use. The inside of the passage may be provided with integral lands for gripping the end of the crutch shaft and the bottom of the base may be provided with grooves for improving the grip of the base in engagement with the ground.

Preferably the bottom of the base is circular and has a diameter several times the distance from the bottom of the passage to the bottom of the base. In one particularly suitable embodiment the base is circular and has a diameter substantially greater than the diameter of the neck.

The invention will be described further, by way of example with reference to the accompanying drawings, in which:—

Fig. 1 is a front elevational view of a crutch with the crutch tip mounted thereon;

Fig. 2 is an enlarged side elevational view of the lower end of the crutch shaft in vertical position, with the crutch tip mounted thereon, the crutch tip being shown in section; and

Fig. 3 is a similar view, showing the movement of the crutch shaft and crutch tip as

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the shaft is moved from a vertical to an angular position.

A preferred embodiment which has been selected to illustrate the invention is adapted to be used on a crutch 10, which may be of any conventional construction. The crutch 10 has an elongated crutch shaft 11 having a bottom 12.

The crutch tip 13 is preferably molded of a single piece of rubber or other suitable resilient material. It comprises an elongated stem or neck 14, which tapers slightly toward its upper end and which is formed integrally with a substantially circular base 15.

The bottom of the base 15 is provided with a plurality of concentric circular grooves 16 to improve the grip of the bottom of the base 15 upon the ground.

The crutch tip 13 is provided with an inwardly directed annular groove 17 which extends around the bottom of the neck 14 at the point where it joins the base 15. The walls forming the crutch tip 13 are thinner along the groove 17 than along the adjacent portions of the neck 14 and base 15, so that the groove 17 defines the line along which the neck 14 will tend to flex with respect to the base 15 in response to angular force directed against the neck 14.

The inside of the crutch tip 13 is provided with a substantially cylindrical hollow crutch receiving passage 18, which is adapted to removably receive and hold the lower portion of the shaft 11 of the crutch 10. The inside of the passage 18 is provided with a series of alternating annular lands 19 and grooves 20. The lands 19 are adapted to engage the sides of the crutch shaft 11 to hold the tip 13 securely in place upon it.

The passage 18 is provided with a flat bottom 21, upon which is mounted a circular metal disc 22. In use, the disc 22 is disposed between the bottom 12 of the crutch shaft 11 and the bottom 21 of the passage 18.

The lower end of the passage 18 is substantially frusto-conical, tapering slightly inwardly from the bottom 21 to provide an annular free space 23, which surrounds the lower end of the crutch shaft 11 when the shaft 11 is disposed in vertical position as shown in Fig. 2 of the drawings.

The thick bottom portion of the base 15 acts to reduce the shock to the user when his body weight is applied to the shaft 11.

It should be noted that the bottom 12 of the crutch shaft 11 is disposed beneath the annular groove 17 which defines the bending movement of the neck 14 with respect to the base 15. Because of this construction, the downward force exerted upon the crutch shaft 11 by the user is always directed against the compression disc 22 and thus against the base 15, rather than against the neck 14.

It should also be noted that the free area

23 which surrounds the lower end of the crutch shaft 11 permits the shaft 11 to assume an angular position within the passage 18 without substantial interference from the walls of the passage 18. This freedom of movement of the crutch shaft 11 within the tip 13 also acts to prevent force being exerted against the inside of the passage 18 which would tend to unseat the bottom of the base 15 from the ground when the crutch is in use.

In use, when the edge of the base 15 is brought into contact with the ground, the neck 14 flexes along the annular groove 17 to bring the entire bottom of the base 15 into contact with the ground. The weight of the user is transmitted through the crutch shaft 11 to the disc 22 and thus against the base 15. This causes the centre of the bottom of the base 15, which normally has a slightly upward curve, to be forced downwardly so that the bottom of the base 15 is flattened against the ground and the grooves 16 provide a suction grip.

As the crutch shaft 11 moves through its normal pivoting cycle, the neck 14 flexes along the groove 17 and the end of the crutch shaft 11 moves from one side to the other of the free space 23. The bottom 12 of the crutch shaft 11 frictionally engages the disc 22, so that wear against the bottom 21 of the passage 18 is prevented. The disc 22 also acts to distribute the crutch load more evenly against the base 15.

Due to its resilience, the crutch tip is self centring in that it restores itself to its normal position when the crutch is lifted from the ground.

#### WHAT I CLAIM IS:—

1. A crutch tip comprising a base, a neck disposed above the base, the neck having a hollow crutch shaft receiving passage therein, the neck having a single line of bending movement with respect to the base, the line being disposed a substantial distance above the bottom of the passage.

2. A crutch tip as claimed in Claim 1, in which the tip is formed of resilient material and the line is defined by an annular groove extending around the neck, the tip being capable of bending along the line in any direction.

3. A crutch tip as claimed in Claim 1 or 2, in which the lower end of the passage is outwardly enlarged to provide a free area which is adapted to permit substantial movement of the lower end of a crutch shaft within the passage when the neck is flexed.

4. A crutch tip as claimed in Claim 3, in which the base and neck are formed of a single piece of resilient material, the free area being tapered outwardly and being substantially frusto-conical.

5. A crutch tip as claimed in any of the preceding claims in which an annular hori-

zontal groove surrounds the neck adjacent the top of the base, the walls of the neck being thinner along the groove than along the adjacent portions of the neck and base so that the groove defines the bending line of the neck with respect to the base.

6. A crutch tip as claimed in any of the preceding claims, in which a disc is disposed adjacent the bottom of the passage, the disc being disposed between the bottom of the crutch shaft and the bottom of the passage when the crutch tip is in use.

7. A crutch tip as claimed in any of the preceding claims in which the inside of the passage is provided with integral lands for gripping the end of a crutch shaft and the bottom of the base is provided with grooves

for improving the grip of the base in engagement with the ground.

8. A crutch tip as claimed in any of the preceding claims in which the bottom of the base is circular and has a diameter several times the distance from the bottom of the passage to the bottom of the base.

9. A crutch tip as claimed in any preceding claim, in which the base is circular and has a diameter substantially greater than the diameter of the neck.

10. A crutch tip constructed substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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SMITH

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COMPLETE SPECIFICATION

1 SHEET

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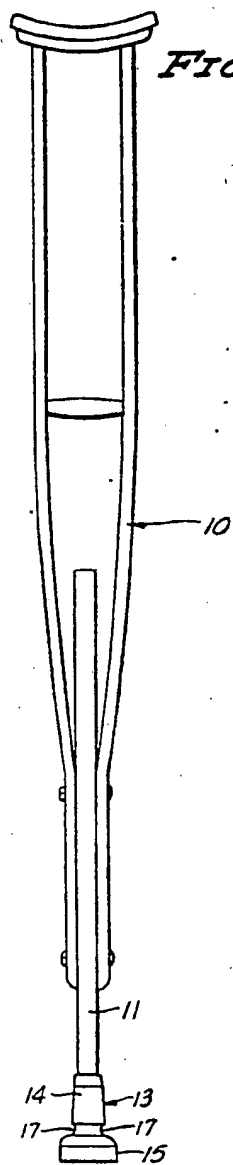


FIG. 1.

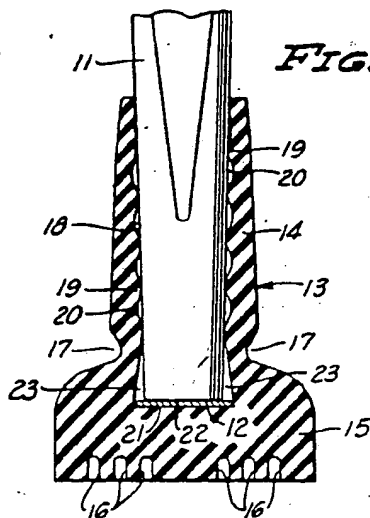


FIG. 2.

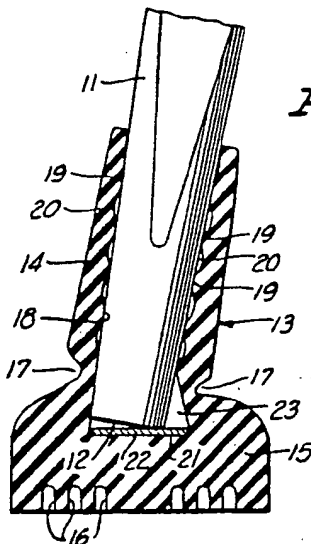


FIG. 3.

GRIPPING GROOVES